DOCUMENT RESUME

ED 177 622 CS 502 632

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TITLE Conducting Task Analysis: The Effects of Interpersonal Dynamics. First Draft.
PUB DATE Apr 79
NOTE 21p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 8-12, 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Communication (Thought Transfer); Information Theory; Interpersonal Competence; *Interviews; Psychological Studies; *Task Analysis

ABSTRACT

This paper explores the interview model of task analysis and attempts to identify the interpersonal variables that affect its efficacy. In addition, it explores why the process of task analysis is important and describes the communication processes that facilitate or inhibit effective process and desired outcome during task analysis. (FL)

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28 June 1979 S.I.G. Symposium, 1979

ED177622

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Conducting Task Analysis:

The Effects of Interpersonal Dynamics

First Draft

Prepared for A.E.R.A. Critique Session #29.18

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UNIX File Name: ppr/aera/sys.res/globals

Number of Words: 5046

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Much has been written and said about the importance, rationale, theory and end result of task analysis (Gagne, 1965, Merrill, 1971, Gibbons, 1976). The ethic that "an ounce of analysis is worth a pound of objectives" (Harless, 1978) appears to make a lot of good sense in many educational environments.

Given its importance in setting the occasion for the instructional design and development process to begin, it's surprising that more attention has not been paid to pinpointing the variables, either empirically or analytically, which affect and control the conduct of the task analysis process. Moreover, since a large number of task analyses are conducted in teams involving an instructional psychologist interviewing a subject matter expert, it's surprising that little attention has been paid to the dynamics of such an important interaction.

The purpose of this paper is to explore the interview model of task analysis and attempt to identify the interpersonal variables which affect its efficacy. The objectives of this paper are to a) explore and describe why the process of task analysis is important and b) to describe the communication processes that facilitate or inhibit effective process and desired outcome during task analysis.

The Task Analysis Process:

As Gibbons, 1976, has indicated in his review of task and content analysis methodologies, there are many models which one can follow in conducting a task analysis. It is not the purpose of this review to critically examine any of these models in detail. The reader is referred to Gibbons's paper for information on such comparisons. However, the process of reaching the basic goal of task analysis is of concern here. That goal, looking globally across all models, appears to be to establish a set of measurable outcomes (i.e., working instructional objectives) for the course or program under consideration. To be more specific, the goal of task analysis is to convert the content expertise (i.e., the S.M.E.'s skills, knowledge, and information) into measurable outcomes for use in instructional design and planning. The purpose of the task analysis interview is to reveal the tasks a learner must perform in order to demonstrate mastery in a subject matter area. This is accomplished by "unlocking" that information from the store of information assumed to be in the mind or at the disposal of the S.M.E. The basic assumptions underlying the task analysis interview process can therefore be stated as follows:

a. The subject matter expert (S.M.E.) has the expertise required of a master performer in the content area under consideration.

b. The instructional psychologist (I.P.) through the interview process of task analysis, can help the S.M.E. get in touch with that expertise and translate it into measurable outcomes.

c. The interaction between the I.P. and S.M.E. will result in a valid representation of the subject or content being analyzed.[1]

1. The issues of reliability and validity of task analysis output can be of importance. In many educational environmenws a check of the validity of output is difficult, if not impossible. Whenever possible, a comparison of task analysis output to real world performance should occur. When such a direct check is not possible quality control is usually hypothesized when a second subject matter expert agrees the output is meaningful with respect to the topic under consideration. In some content areas the issue of reliability is of little immportance and provides no information about the importance of the output with respect to the topic being covered (i.e., English Literature instructors rarely agree what material should be covered or what students should gain from a course in literature, even when the topic is narrowly defined by a period of time or a place or origin.

It's fairly obvious at this point that violation of any one of the three assumptions listed above will not yield a task analysis product of much significance. In many instructional settings one or more of the above assumptions may be in question and require attention even before task analysis can begin. It's also not the intent of this paper to present information useful in resolving problems that may result when one or more of the assumptions are in question. These types of problems require much more than better communication behaviour and should be dealt with in a paper dedicated to these important issues. For the purposes of this paper, it is assumed that problems associated with any one of these assumptions are not severe enough to disrupt the task analysis before it even begins.

Why Task Analysis Processes Are Important

Understanding the dynamics of task analysis process is especially important for the Instructional Psychologist involved in task analysis with an S.M.E. Task Analysis can be very "risky" for the S.M.E. for several reasons. First, the S.M.E. is confronted with a highly competent learner to whom

s/he must "teach" the content to (i.e., the S.M.E. must be able to make things clear to the I.P., who is usually a competent learner). Unlike many classroom situations involving several students, the S.M.E. cannot explain away any teaching difficulties by using the student as a scapegoat (e.g., the students are unmotivated, dumb, etc.). Therefore, being involved in task analysis may be much more risky than teaching to a large group. Second, task analysis forces a rational organization of ideas, concepts, and tasks. This may also increase the amount of risk, especially when the S.M.E. learns that his/her previous organization wasn't very good or that some of the concepts were vague, overlapping, or hard to clarify. Coupled with the first source of risk (the competent learner), the S.M.E. may begin to shift the blame for intuitive sense of failure from students to himself. A highly competent S.M.E. may begin to question their grasp of their field. Many competent S.M.E.'s often feel that their field is developing at such a rate that they are never completely "on top" of everything. The task analysis experience could be enough to push them over the balance line between security and insecurity in their field, resulting in considerable guilt and anxiety.

Either one or both of the above risks may result in a resistance to task analysis. Such resistance can emerge either through the overt signs of anxiety or guilt, on the part of the S.M.E., a distortion of information provided by the S.M.E., or a blocking by the S.M.E. of the I.P.'s efforts to understand the content. Statements by the S.M.E. similar to those often given to students who are having difficulty with unclear content may result (e.g., "Read the material closely and then you'll understand" or "It's up to you to sort out your confusion. That's what learning is all about.")

Fortunately, many of the above problems can be mitigated by the effective use of task analysis process variables. The present interest of this paper is to describe these variables which include:

a. Contracting

b. Effective communication

c. Teaching the S.M.E. the task analysis model being used

The Psychological Contract:

It can be hypothesized that the moment two people begin interacting some type of agreement, either implicit or explicit, between the people involved in the interaction is esta-

blished. Such agreements, which will be referred to as psychological contracts, are usually implicit on the part of both parties and neither party may be consciously aware of the specific nature of the contract. For example, upon meeting someone for the first time at a cocktail party there are certain rules and forms of interchange which are deemed appropriate in Western culture. It's in accordance with the implicit "psychological contract" to ask someone "What do you do for a living?" or "I really enjoy getting out and meeting new people." However, that implicit "psychological contract" begins to be violated upon first meeting someone who asks: "How much money do you make?" or "What would you do if you had the problems I have with my marriage?". The contract must be modified for such interaction to be comfortable to those involved. Such modification to the implicit contract occurs through time and by continual interaction between parties. As people come to know each other better they learn the boundaries of possible interaction and behave accordingly. They chit-chat with their casual friends, rarely getting into "heavy" conversations, while they may spend hours talking about their problems and lives with a close friend, relative, or counsellor (someone with whom they had set different boundaries for the interaction).

It is important to note that the nature of the psychological contract has a great deal to do with the amount of information that flows between parties involved in a discussion. Although violation of a psychological contract can result in additional information being obtained at the moment and a possible expansion of the contract boundaries (positive repercussions), violation of the contract could also result in restriction of total information flow, discomfort to one or both parties involved in the interchange, and perhaps even avoidance of future discussion (all negative repercussions).

The psychological contact is also an important variable in the task analysis interview situation. The basis of the psychological contract in task analysis is established simply by the assumptions underlying the need for an interview in the first place. That is, the basic assumptions which underlie the task analysis interview (see page 2) dictate the implicit psychological contract which is put into place when task analysis begins.[1]

1. This assumes the basic goals and processes of task analysis are clear to the persons involved.

The Instructional Psychologist assumes the S.M.E. is an expert in the content area under consideration and the S.M.E. assumes the Instructional Psychologist will be able to conduct the interview to produce the needed output. Both par-

ties assume the result will be a set of measurable outcomes representing the content area in question. Both parties also agree to interact in order to solve the problem although the specific nature of this interaction is not defined by either party. The psychological contract at this point specifies nothing more than that two people will interact in order to conduct a task analysis. Although this "basic" contract is necessary for the beginning of task analysis, it is most often incomplete and may prove non-functional as interaction continues. Inadequate attention to the proper establishment of a more explicit psychological contract between the parties involved in task analysis has caused disruption to the efficiency and effectiveness of many task analysis interactions, independent of the demeanour and/or general attitude of the parties involved.

Establishing an Explicit Psychological Contract:

The first step in establishing an explicit psychological contract for task analysis interviewing is to define the type of interaction that will occur during the interview process. An explicit contract would therefore include the clear understanding and agreement by all parties of the following variables:

a. the length of the process

b. the frequency of meetings

c. the amount of stress the interaction may cause

d. the nature of the process (i.e., how the I.P. and S.M.E. will interact)

e. the goals of the process (e.g., to produce outcomes for the course or program, to teach the S.M.E. the process, to improve upon already existing task or content organizations, etc.)

Communicating the above types of information to the S.M.E. can be accomplished in a variety of ways and using a variety of delivery techniques. The I.P. could begin the process by describing the type of interaction that will occur and the types of behaviour to expect during the interview. For example:[1]

1. The tone of the example provided is somewhat formal. Although tone can be important in any interchange, it should not be confused with the exchange of information deemed critical in establishing a functional contract. The functional

contract is important in any task analysis interaction while tone can be varied to fit the style and attitude of the parties involved.

> I.P. "My plan for conducting this interview is to let you do most of the talking. When I don't understand something you're saying, I'll stop you, if that is okay, and either try to repeat what you said in my own words or ask you a question for clarification. You can then indicate if you think I understand what you've said or answer the question. I'll try to write down your comments in a form I will understand later on and in a form which will allow us to write instructional objectives later on. Feel free to correct my interpretations at any time or make changes to what I write down."

In the above example the basic psychological contract is expanded to include a definition of the type of behaviour which is appropriate for both parties involved. In addition, the roles are further clarified by the I.P. indicating that the S.M.E. is to do most of the talking, the I.P. will serve as the scribe, and the S.M.E. has the last say on the output of the interview both verbally and in writing.

The I.P. may also choose to use other delivery forms to better communicate the process and goals of task analysis to the S.M.E. In addition to verbal descriptions, the I.P. may use specially designed written information, existing texts on the subject, video examples of the process, and/or audio examples of the process to convey this information. Although it is important to expand the explicit contract and generally inform the S.M.E. about the task analysis process, the I.P. should be careful not to "overwhelm" the S.M.E. with additional work and detail. It would be impossible to specify in advance the amount of information a given S.M.E. may require or be interested in regarding task analysis. Many S.M.E.'s may feel that the I.P. should simply explain the process briefly while others may wish to discover for themselves what others have said and written about task analysis.

Establishing an Implicit Psychological Contract:

The I.P. also works to expand the implicit psychological contract during the interview process. This is accomplished to a large degree by following the explicit rules already communicated to the S.M.E. However, it's also facilitated by using interviewing techniques which reduce risk and increase the trust the S.M.E. has that the I.P. will not "put him/her down" or make him/her feel threatened during the interview. The importance of such trust cannot be over-emphasized. The S.M.E., just by being in the task analysis interview, is

placing him/herself in a vulnerable (i.e., risk) position. Most S.M.E.'s have rarely engaged in such intensive scrutiny of their expertise and are often not totally prepared for the conversion of their knowledge and skills into objective outcomes. Even when they readily agree that the task analysis process is an important step in the overall instructional design process, they may find it difficult to accept that order can be made to what they previously thought was highly abstract and complex information. An I.P. who assumes such feelings on the part of the S.M.E. are <u>not</u> warranted may find him/herself spending long frustrating sessions attempting to pinpoint measurable outcomes, often with limited success. The establishment of a functional implicit contract is greatly facilitated by the proper use and understanding of communication processes and communication goals. In general, the communication goals which appear to be most important to the task analysis situation are as follows:

a. The I.P. must be able to listen non-judgementally (e.g., not to give advice about content or content structure)

b. The locus of control of the direction of the content must remain in the hands of the S.M.E.

c. The I.P. must communicate in a way that enhances the S.M.E.'s self-understanding and the I.P.'s understanding of the S.M.E.

d. The I.P. must encourage the S.M.E. to discuss content freely and openly (i.e., to risk saying "I'm not sure" or "I'm confused.")

The I.P. should strive to reach and maintain the above goals throughout the task analysis interview sessions. An effective implicit contract is established and maintained mainly by attempting to reach the above goals and by establishing the explicit contract as described previously.

One of the major ways to ensure that the above communication goals are reached and maintained is to use effective communication responses during the task analysis. Communication responses for task analysis can be defined as any response made by the I.P. during a task analysis interview. That is, the types of information being conveyed by the I.P. during task analysis which result directly or indirectly from verbal responses made by the I.P. may be considered to be communication responses.

The following types of communication responses tend to facilitate the communication goals of task analysis:

a. Clarifying a response made by the S.M.E. by asking for elaboration

b. Clarifying a response made by the S.M.E. by paraphrasing that response

c. Clarifying a response made by the S.M.E. by asking for reasons why that response was made or why it is important

d. Using a probing question if that probe is accompanied by an explanation regarding why the I.P. is asking the question

In general, all of the above response forms tend to facilitate the goals of the task analysis as defined above. In addition, they also serve an important information and clarification function for the I.P. Therefore, the use of these response forms serves a facilitative role in both the task analysis interview and the interpersonal process.[1]

1. More complete information about paraphrasing can be found in Rasmussen et al., Introductory Interpersonal Communications, Athabasca University, 1978.

In contrast to the above types of communication responses, the following responses tend to inhibit the goals of the task analysis communication:

a. Advising the S.M.E. about the content being discussed

b. Criticizing comments made by the S.M.E.

c. Making a response which changes the subject

d. Asking questions that contain advice or criticism

e. Using a probing question without an explanation of why the I.P. is asking that question.

The above response forms tend to disrupt the task analysis process in addition to inhibiting the interpersonal process. Moreover, the types of information sought by each of the above response forms can be obtained through the use of the more facilitative communication response forms.

Although the importance and relationship between the facilitative communication response forms and the task analysis goals may appear somewhat obvious, the actual conduct of task analysis effectively using facilitative response forms is

much more difficult. A recent examination of both tapes and live interaction between I.P.'s and S.M.E.'s involved in task analysis strongly indicates that the I.P. must have both extensive training and experience in the use of facilitative communication responses in order to use them effectively. Furthermore, the probability of the I.P. using facilitative communication responses also appears to be influenced by the I.P.'s perception of the competence of the S.M.E., the verbal behaviour of the S.M.E., and the attitude and expectations the S.M.E. has regarding the I.P.'s ability to implement the task analysis methodology.

The tendency of the I.P. to be more critical and give content advice during task analysis also appears to be related to the I.P.'s familiarity with the subject matter being analyzed. One of the major tendencies is to "sneak in" advice and criticism in question form. For example, the question, "Will you elaborate on the concept you have just defined in more detail?" or "Does that concept relate to the one we just discussed?" are, in most cases, okay questions to ask (i.e., the I.P. is seeking an answer to a question and is not violating the implicit contract). In contrast, the question, "Isn't that concept really related to another course?" or "Doesn't that skill actually involve only three steps?" are really an expression of the I.P.'s opinion in question form. It's important that the I.P. avoid the use of questions to express an opinion, even if the I.P. is familiar enough with the subject matter to have a valid opinion. The swapping of opinions should only occur later in the task analysis when the implicit contract is expanded to allow such interaction to occur safely.

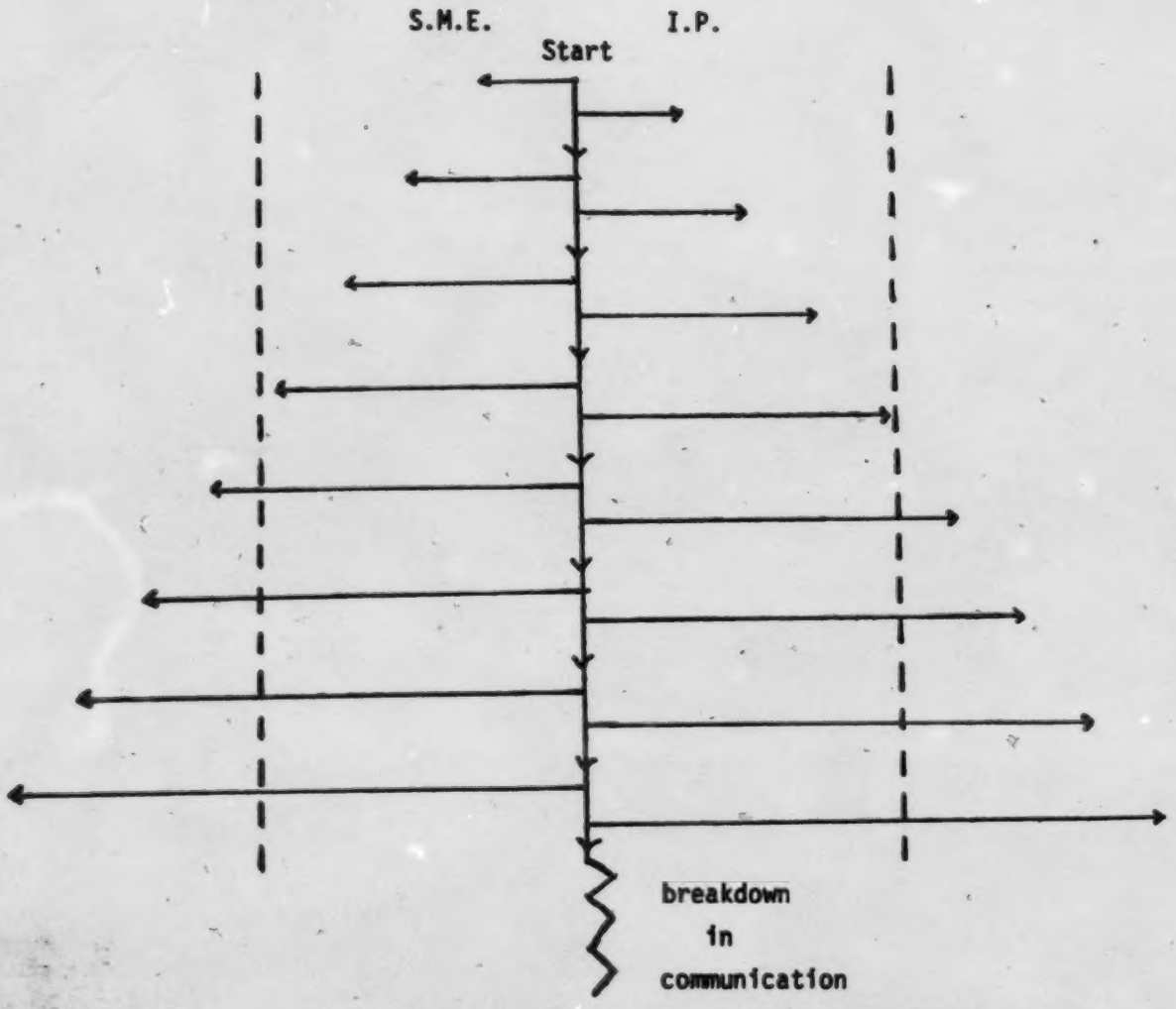
The illustration in figure one indicates the types of difficulties two parties can encounter when opinions are swapped. A type of polarization occurs in the exchange forcing the opinions to take dimensions not represented by the "real" opinion of the speakers. An exchange of this type usually results in either dominance by one party, dissolution of the interaction, and/or a feeling of frustration by one or both parties caused by the perceived lack of communication. Such phenomenon can have disastrous consequences in the early stages of task analysis. The goals of task analysis are completely counter to the results of the opinion-opinion exchange situation. The I.P. should be trying to eliminate a need for a dominant person in the discussion even though the I.P. wants the S.M.E. to do most of the talking. Obviously dissolving the interaction is of little use and must be avoided. The third factor, a feeling of frustration, must also be avoided. The task analysis process is difficult enough for the S.M.E. without causing added aversiveness through improper communication. The I.P. should be working

toward increasing the probability of S.M.E. interaction by avoiding making the consequences of S.M.E. statements aversive (often the result of opinion swapping). Stated simply, the goal of the early stages of task analysis is to attempt to understand what the S.M.E. is talking about, not to change it, classify it, or debate its accuracy or meaningfulness. Such interaction may be possible in later stages of task analysis after the psychological contract has been expanded to include such interaction.

OVERHEAD # 6

"Statement of Opinion Expressed by a Speaker"

Figure One



The arrows represent a statement of opinion expressed by a speaker in the interchange. The length of the Arrow represents the strength of the opinion and commitment the speaker has to the statement. The dotted line represents the "true commitment" of the speaker to the opinion statement.

Place Figure 1 about here

Figure 1 Statement of opinion expressed by a speaker

The arrows represent a statement of opinion expressed by a speaker in the interchange. The length of the arrow represents the strength of the opinion and commitment the speaker has to the statement. The dotted line represents the "true commitment" of the speaker to the opinion statement.

Reading the Interaction Patterns:

For many complex tasks it is usually much easier to talk about how to perform them than to actually engage in that behaviour in a realistic situation. The same is true of task analysis. Understanding the dynamics and process is one thing, but performing such a complex set of skills is something else again.

One of the keys to performing effectively in any complex situation is to be able to identify when problems are occurring and then adjusting accordingly. Such a strategy is especially important during the task analysis process. The I.P. must continually monitor the interaction looking for signs of difficulty.

"Reading" the task analysis interaction involves three simultaneous monitoring functions. The first monitoring function involves an analysis of the content being provided by the S.M.E. The I.P. must ascertain how much difficulty the S.M.E. is having in discussing the content in detail. In general, the I.P. is trying to ascertain whether the S.M.E. is prepared to discuss the content and tasks at a level consistent with the desired result. In some cases it may be necessary for the S.M.E. to spend time thinking, reading, or discussing the content with a colleague before the task analysis process continues. The I.P. should attempt to identify when such a break in the task analysis process should occur. The following occurrences indicate that the I.P. should consider such a "study-break" before proceeding:

a. The S.M.E. pushes on to new topics even when the I.P. feels and indicates the need for more information on each topic.

b. The S.M.E. does not clarify or affirm a paraphrased statement made by the I.P. but goes on to the next point.

c. The S.M.E. makes statements indicating a need for more thinking on many of the topics being considered.

d. The S.M.E. cannot discuss the content in a way which lends itself to the specification of measurable student outcomes.[1]

1. The S.M.E.'s refusal to discuss the content in a way which lends itself to the specification of measurable outcomes or objectives can be a problem unrelated to the momentary expertise of the S.M.E. The S.M.E. may feel such "objectification" of the content is making it appear trivial, too simple, etc. Stopping the task analysis and renegotiating the basic

contract and goals of the process must occur before work can proceed meaningfully.

The I.P. must also monitor the interpersonal dynamics which are occurring during the task analysis process. This is accomplished by identifying the types of interviewing responses the I.P. is making and what effect such behaviour is having on the S.M.E. The following are the main factors to watch:

a. Who is doing most of the talking?

b. Is the I.P. using facilitative communication responses?

c. Does the S.M.E. provide input to paraphrases and answer questions?

d. Does the S.M.E. repeat statements more than once in an attempt to increase understanding?

e. Does the S.M.E. indicate that the I.P.'s technique is helping him/her get better insight into the content?

The third factor the I.P. must monitor and read during the task analysis process involves the non-verbal behaviour of the S.M.E. The I.P. must watch and listen carefully in an attempt to determine how the process is affecting the S.M.E. The following cues are especially important ones to monitor:

a. The S.M.E. appearing disinterested or bored.

b. The S.M.E. showing signs of anger or frustration (loudness of voice, higher voice pitch, etc.)

c. The S.M.E. looking tense (tightening of facial and shoulder muscles).

d. The S.M.E. showing a reluctance to begin again after a break.

e. The S.M.E. not showing up for the scheduled sessions.

The importance of carefully monitoring and reading the S.M.E.'s behaviour during task analysis is to make adjustments to one of the following variables:

a. The behaviour of the I.P. (a return to communication patterns important in establishing an implicit psychological contract is usually necessary).

b. A modification of the contract (usually an explicit modification made through an open discussion of what should occur).

c. The behaviour of the S.M.E. (the S.M.E. should have the option of taking time out from engaging in further task analysis activity).

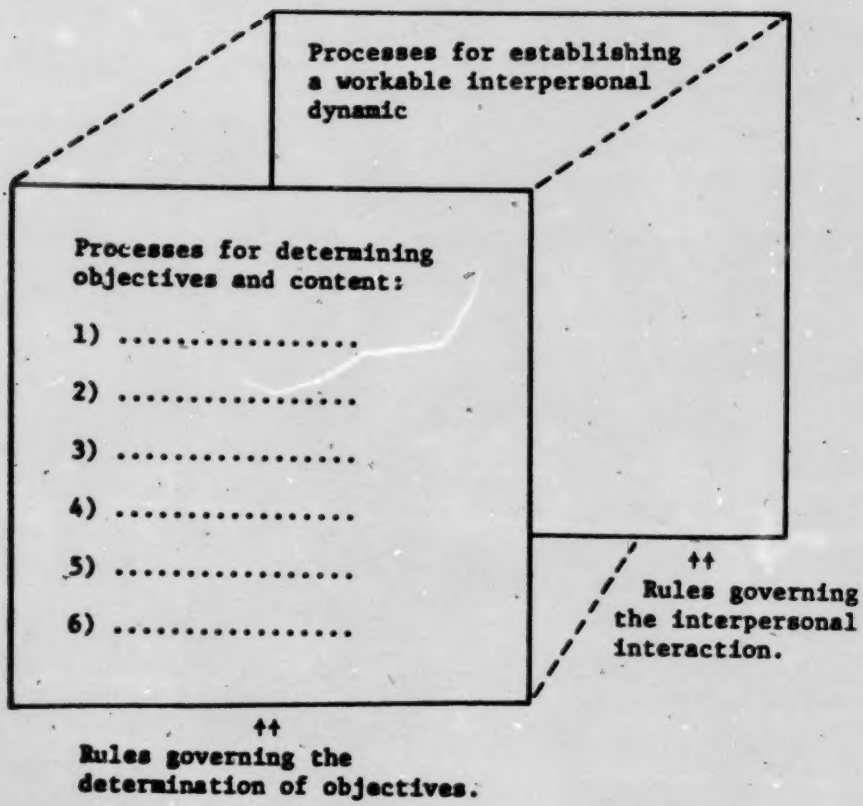
It should be noted that the I.P. is responsible for determining what steps should be taken, even when the step involves only the S.M.E. The general ethic "the S.M.E. is always right" should prevail. Such an ethic requires that the I.P. examine his/her own behaviour first, before being critical of the S.M.E. Although it is entirely possible that a totally incompetent S.M.E. may be the problem, it is most unlikely that the I.P. will be the one who classifies the S.M.E. as such. Moreover, many of the problems identified as destructive to the task analysis interview reveal little about subject matter competence. Such problems tend to be related more to poor interpersonal communication, a variable which the I.P. does have personal control over to a large degree.

Conclusions:

This paper has addressed the need for the careful use of interpersonal processes during task analysis. The underlying rationale for the importance of such processes during task analysis is illustrated in figure two. In figure two, the overall process of task analysis is shown as a dual process

OVERHEAD #8

FIGURE TWO: A Dual Process Model for Task Analysis



Place Figure 2 about here

Figure 2 A dual process model for task analysis

involving the processes of determining objectives and the processes useful in establishing an effective interpersonal relationship. The model suggests that you cannot have an effective task analysis without the proper occurrence of both processes. The experience of many Instructional Psychologists working in a variety of educational settings provides support for the dual process model. A careful examination of the behaviour of several Instructional Psychologists working at Athabasca University over a one year period has clearly indicated the importance of good interpersonal skills during task analysis. Moreover, the importance of these skills appears to be totally unrelated to the specific process of task analysis adopted by the I.P. (hierarchical task analysis, information mapping, etc.) The quality of the end product and the satisfaction with it appears to be more a function of the nature of the interpersonal dynamic than of the task analysis method employed or the experience of the S.M.E. with the task analysis method chosen.[1]

1. It should be noted that the observations leading to these conclusions were made by the first author in his role as the supervisor of a large staff of Instructional Psychologists at Athabasca University.

The processes described in this paper as being important in task analysis are also highly consistent with recent theories describing the important dimensions of interpersonal relationships (Maier, 1967; Rowell, 1973). Factors which control the effectiveness of groups on problems like the "Desert Survival Problem" closely resemble the factors described as important in task analysis. A problem solving orientation for task analysis appears to make good sense when the situations labelled as "problems" and the task analysis situation are compared. In the desert survival problem (and most other problematic situations encountered in real life) the best solution may not be immediately known to the parties involved. They are expected to provide their expertise "synergistically" to determine a workable solution best suited to the problem (Maier & Hoffman, 1960). The situation during task analysis is often similar. The S.M.E. may know the content thoroughly but cannot create an organizational scheme or method of communication which anybody else will understand. The I.P. has the tools of organization and communication but cannot use them due to a lack of content expertise. Together they are attempting to solve the problem of organization and communication "synergistically" by pooling their expertise. Experience with problems like the desert survival problem clearly indicate the importance of interpersonal process in reaching the best solution possible. The same phenomenon appears to be equally important during task analysis.

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